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TOPIC: What is a green mining concept and how can it be implemented or further implemented in Guyana? (1426 words)

History tells us that “Guiana”, as it was called before our Independence, has been a point of attraction for those searching for the treasure of El Dorado. Indeed, Guyana is extremely rich in gold, diamonds and other precious minerals. We have read that European ships that returned from “Guiana” were loaded with gold and other precious metals. Ever since, mining for these precious minerals became a major economic activity in our country. Guyana contains one of the most prospective, yet under-explored, gold regions in the world. It has a long history of alluvial gold production, however only in 2004 foreign investment and mineral exploration was allowed after the enactment of the Land Tenure Act in 2004. While Guyana is rich in gold, diamond and other precious minerals, we are also rich in forest resources with one of the highest proportions of forest cover of any country in the world as reported by the REDD Desk. Guyana is covered by 87% forest, being a major carbon sink.

With our resources being extremely valuable, mining activities has increased with the use of improved machinery for vegetation clearing and soil removal to enhance production. While these machineries make production more efficient, they also require fossil fuels to function. The burning of such fuels releases dangerous emissions into the atmosphere, harming the ozone layer and human health. This method is definitely not green. Currently, when lands are mined in the interior of Guyana, virgin vegetation are being cleared and wasted. This reduces the amount of carbon dioxide being absorbed since those trees acts as carbon sinks. Sometimes the occurrence of minerals is not definite yet the land is being cleared and mined with the hope of finding gold and diamond. Removal of the vegetation also leads to soil degradation through erosion since there are no trees' roots to hold the soil together to keep the soil's structure. With the loss of vegetation from mining, the soil becomes acidic, low in organic matter and experiences poor drainage. The removal of vegetation for mining also leaves the environment in an inhospitable state, resulting in the loss of biodiversity. Further, during mining in Guyana, the top soil and several hundred meters of soil that is removed is often not reclaimed. Rather, the mined out areas are left and becomes large tailing ponds which sometimes overflows and contribute to flooding of nearby communities. We have read of issues where miners are intruding on the lands that belongs to the indigenous people of Guyana. Additionally, mining in Guyana is being done using cyanide to bind the gold ions allowing separation from the rock. This can lead to cyanide run-off into drainage systems which contaminates water used by surrounding communities and creates inhospitable environments to aquatic life in surrounding water ways. All of the above methods are damaging to the environment and the social well-being of communities. In effort to make mining a more environmentally, socially and at the same time economically sustainable activity, a Green Mining Concept is needed immediately.

As outlined in the previous paragraph, mining activities are definitely not being carried out in an environmentally friendly manner. Even though mining cannot be fully “green” because it involves mass disturbance of the natural environment, social well-being of communities but increases economic benefits, a “Green Mining Concept” can be implemented to reduce the impact of mining on the three aspects of the environment.

The Natural Resources Ministry of Canada (NRC), defined “Green Mining” as the technologies, best practices and mining processes that are implemented as a means to reduce the environmental impacts associated with the extraction and processing of metals and minerals. Green mining is important for our economy because it improves the material and energy efficiency as well as the practices in the use of chemicals of mining operations which reduces health hazards as well as the environmental footprint that occurs during production life cycles. The implementation of a green mining concept can result in the reduction of greenhouse gases by using selective mining approaches and reduction in chemical use which will reduce soil and water pollution, ultimately reducing the ecological footprint of the process. Since Guyana has signed on to various environmental conventions, it is absolutely necessary that we implement a Green Mining Concept in order to uphold our commitments to the world. A Green Mining Concept includes several Green mining techniques that can be implemented to combat each of the unsustainable practices outlined previously. The implementation of each technique in the concept is being discussed in the following paragraphs with respect to their individual current unsustainable method.

Firstly, mapping of all resources needs to be done so that a practical land use plan can be implemented. While forest resources can be mapped using technologies such as Remote Sensing and Geographical Information Systems, mapping of minerals in the soil can be more tedious. Ground magnetic surveys can be done to determine the occurrence of mineral resources beneath the surface so as to prevent cases where the area is mined with uncertainty of a find.

A green mining concept to address mass deforestation caused by mining would be the implementation of a proper land use plan. In Guyana, mining is given precedence over logging while most mineral resources are found in Guyana’s green belt and the vegetation cleared are usually wasted. The implementation of a land use plan whereby the area is logged before mining begins would ensure economical sustainability. Subsequently, the mined out lands should then be reforested using appropriate species of trees or biofuel crop which we need to ensure are not invasive to our natural forest. Reforestation will ensure forest cover is restored as a carbon sink while the soil will be stabilized and tailings ponds will be avoided, reducing effects

on the communities. Gradually the reforested area will be restored with biodiversity while other areas can be mined using the same concept starting with land use planning.

The use of fossil fuel to power mining machinery can be addressed by substituting these fuels with biofuels. Guyana has the potential to produce biofuel crops on a large scale. Since mined out areas are usually not suitable for agriculture, those reclaimed lands can be used to cultivate biofuels such as the giant king grass or oil palm which is used to make biodiesel. These crops are known for their ability to grow in harsh conditions and it requires minimal to zero fertilizer. They can then be converted to various forms of energy using small portable units. Using biofuel from the giant king grass results in net zero carbon dioxide emissions.

While it was established that cyanide is harmful to humans and the environment, other green alternatives can be used to extract gold. One such example is the EnviroLeach process which is similar to a cyanide circuit but it is safer and simpler. The process involves the dissolution of the precious metals into the aqueous solution. This is then followed by extraction using conventional methods such as electrowinning, carbon absorption or precipitation. Alternative operations like the EnviroLeach are simple and does not require complex process circuits, intensive gas monitoring or detoxification systems. This method was proven to be equally efficient as cyanide in gold extraction while offering extra protection to the environment.

In order to make this green mining concept work in Guyana, I believe that the Government and Tertiary Educational Institutions should invest in upgrading technological research. This will assist in developing new green mining techniques which can better the mining process in Guyana. While some will say technology has put us in the situation where earth is being depleted, I believe technology can also solve the issue of environmental degradation and also technology in the form of social media can be used to promote the green mining concept.

In conclusion, a Green Mining Concept which is made up of various Green Mining Techniques offer superior performance with respect to energy efficiency, greenhouse gas emission and other forms of pollution. It all begins with a land use plan and goes all the way up to using alternative methods for chemical extraction. A Green Mining Concept also contributes to restoration of forests and other habitats which will reduce the risk of extinction of species and mass deforestation. Green mining should be first priority for our country because of our obligation to the world in environmental conservation. Though Green Mining

Techniques may be more expensive, mining industries across the world are beginning to see the value in taking the risk, and so should Guyana for our environment, for our planet and for our future.